neMESYS®

Original Setup and Operating Manual 2.01 – May 2015

neMESYS OEM

Hardware Manual

cetoni®

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cetoni GmbH
Wiesenring 6
D- 07554 Korbussen
Germany
Tel.: +49 (0) 36602 338-0
Fax: +49 (0) 36602 338-11

E-Mail: info@cetoni.de
Internet: www.cetoni.de

1. Overviews and Indexes

1.1. Content

1. Overviews and Indexes 5

1.1. Content 5

1.2. Revision History 8

2. Introduction 9

2.1. Preface 9

2.2. Symbols and Keywords 9

3. Basic Information 10

3.1. Standards and Guidelines 10

3.2. Intended Use 10

3.2.1. General Description of the Component 10

3.2.2. Proper Use 11

3.2.3. Reasonably foreseeable Misuse 11

3.2.4. Safety Measures 11

3.2.5. Measures for safe Setup 13

3.2.6. Safe Operation Measures 13

3.2.7. Condition of Devices 14

3.3. Warranty and Liability 14

4. Technical Data 16

4.1. Performance Data 16

4.2. Dimensional Drawing of Pump 18

4.3. Standard Valve 19

4.4. Dimensional Drawing of Valve 19

4.5. Dosing Performance 20

5. Transport and Storage 21

5.1. Transport 21
5.2. Maintenance and Care 21

6. Hardware Operation 22
6.1. Installing a Syringe 22
6.2. Fluidic / Valve 25
6.3. Removing Valves 27

7. Electrical Interfaces 29
7.1. Overview 29
7.2. Power Supply (J1 / J2) 30
7.2.1. Pin Assignment 30
7.2.2. Technical Data 30
7.3. CAN Interface (J3 / J4) 32
7.3.1. Pin Assignment 32
7.3.2. Technical Data 32
7.3.3. Connecting neMESYS to CAN bus line CiA DS-102 32
7.4. RS-232 Connection (J5) 33
7.4.1. Pin Assignment 33
7.4.2. Technical Data 33
7.4.3. Connecting neMESYS to a PC 34
7.5. Signal Connection (J6) 35
7.5.1. Pin Assignment 35
7.5.2. Analog Input 1 and 2 (Pin 1 and 2) 36
7.5.3. Digital Inputs 1 and 2 (Pin 3 and 4) 36
7.5.4. Digital Input 7 (Pin 5) 38
7.5.5. Digital Output 1 and 2 (Pin 6 and 7) 39
7.5.6. Digital Output 5 41
7.6. CAN-Bus Termination 43
7.7. Switching the integrated Valve 43

8. Cable Set 45
8.1. Power Cable 45
8.2. Power Connection cable 45
8.3. CAN Cable (terminated DSub socket) 46

8.4. CAN Cable (DSub plug) 47
8.5. CAN Connection Cable 47
8.6. CAN Terminator 48
8.7. RS232 Cable (DSub socket) 49
8.8. USB-to-CAN Adapter 49

9. Setup & Cable Connection 51
9.1. Mechanical Setup 51
9.2. Introduction to Cable Connection 51
9.3. Step 1 – Connecting the Power Cable 51
9.4. Step 2 – Data Connection 52
9.4.1. Introduction 52
9.4.2. Data Connection through CAN 52
9.4.3. Data Connection through RS232 53
9.5. Step 3 – Power Supply of additional Modules 53
9.6. Step 4 – Data Connection to additional Modules 53
9.7. Step 5 – CAN Bus Termination 53

10. Disposal 55

1.2. Revision History

Rev	Date	Modification
1.03	17.08.2010	• Creation of Manual
2.00	09.01.2015	• Revision for new Hardware
2.01	30.03.2015	• RS232 cable modified (DSub jack instead of plug) • Added logic table for valve switching

2. Introduction

2.1. Preface

Thank you for purchasing a cetoni product. With this manual we would like to support you in using the device. For additional questions or comments please feel free to contact us directly.

2.2. Symbols and Keywords

This manual uses the following symbols, intended to help you navigate the document:

TIP

User tips and useful information to simplify the use of the software.

IMPORTANT

Important information and additional, particularly useful information. This symbol does not refer to dangerous or hazardous situations.

CAUTION

This symbol signifies a potentially hazardous situation. Failing to avoid it may cause damage to the product or its environment.

WARNING

This symbol signifies a potentially dangerous situation. Failing to avoid it may cause light or insignificant injury or material damage.

3. Basic Information

3.1. Standards and Guidelines

neMESYS OEM-modules conform to the basic health and safety requirements stipulated by the 2006/42/EC machine directive. The modules are incomplete machines according to the 2006/42/EC machine directive and intended for installation into a machine. According to the directive they do not bear the CE mark.

Integrating the modules into a machine may cause additional risks. It is imperative that you conduct a risk evaluation of your machine with the integrated modules and take any safety measures necessary.

IMPORTANT

Please note that you may not use neMESYS OEM-modules until the machine or plant into which the modules are integrated complies with the 2006/42/EC machine directive and the declaration of conformity in attachment II A has been issued.

3.2. Intended Use

3.2.1. General Description of the Component

neMESYS devices are syringe pumps. They enable emptying and filling of syringes through a linear relative movement between a syringe holder and a piston holder.

The OEM-module is not a complete machine as defined by the machine directive, but an incomplete machine intended for installation into another machine or

plant. Please refer to the information provided in chapter 9 of this manual with respect to installation and cable connection.

3.2.2. Proper Use

The neMESYS syringe pump system is intended for high-precision and pulsation-free dosing of fluids in a range from nanoliters to milliliters per second. Depending on the device being used, pressures in excess of several hundred bar may be reached. The devices are typically used in a lab-like environment.

3.2.3. Reasonably foreseeable Misuse

Using the devices in applications other than the ones intended for them may create dangerous situations and must be avoided.

WARNING

The devices must not be used as medical devices or for medical purposes.

3.2.4. Safety Measures

Operator safety and failure-free operation of the devices can only be guaranteed when using original equipment parts. Only original accessories may be used. Warranty claims are void if damage was caused by using third-party equipment or third-party material.

The devices were developed and designed in such way as to largely rule out dangers, if used properly. Nevertheless, you should observe the following safety measures to rule out any residual danger.

- cetoni GmbH would like to point out the operator's responsibilities when using the device. Local laws and regulations relevant to using this device must be observed. In the interest of a safe work process the operator and user of the device is responsible for observing all relevant laws and regulations.

- The devices must not be used as medical products or for medical purposes.

- The device is designed and approved for operation in systems governed by article 4 section 3 or the pressurized devices directive 2014/68/EU. This means that he devices may not exceed a maximum volume of 1 liter. When using group 1 fluids according to article 13 of the pressurized systems directive 2014/68/EU, the maximum allowable system pressure is 200 bar. It is 1000 bar for group 2 fluids. If the “Technical Data” section stipulates different product-specific maximum pressure values, such values must be observed. Particular attention must be paid to not exceeding the pressure range of the respective sensor. The information provided in the “Technical Data” section with respect to the maximum operating temperature must be observed. cetoni GmbH is not liable for potential impacts caused by the user extending the system with peripheral devices in a way that causes one or both of these values to be exceeded. The operator is responsible for becoming acquainted with the aforementioned pressurized systems directive and observing applicable stipulations.

- Before each operation of the device the user has to ensure that the device is functioning safely and is in proper condition.

- The user must be familiar with the operation of the device and the software.

- Before starting operation, the devices and wiring must be checked for damage. Damaged wires and plugs must be replaced immediately.

- Cables must be routed in such way as to rule out any trip hazards.

- Do not touch moving parts on the devices during operation. There is a risk of crushing.

- Operating the devices in an explosive environment or with explosive substances is prohibited!

- Make sure to wear safety goggles during installation work on the device or when you work with corrosive, hot or otherwise dangerous substances.

- Transport, storage or operation at temperatures below 0°C with water in the fluid channels may cause damage to the devices.

3.2.5. Measures for safe Setup

- Mechanical and electrical installation of pumps may only be done by skilled personnel.

- Make sure that all devices are installed in line with local laws and regulations.

- Please note that, principally, the OEM-pumps cannot be considered fail-safe. You have to ensure that a failing pump will not cause damage to your application by employing suitable safety and monitoring measures.

- Please note that you are not authorized to repair cetoni devices or components.

- Make sure that the power supply is not active and cannot be activated while conducting installation or wiring work on the devices.

3.2.6. Safe Operation Measures

3.2.6.1 Electromagnetic Emissions

The neMESYS syringe pump system is designed for usage in any facility directly connected to a public supply network that also supplies buildings used for residential purposes.

3.2.6.2 ESD-Discharge

Floors should be wood or concrete or covered with ceramic tiles. If floors are covered with synthetic material, relative air humidity must be at least 30%.

3.2.6.3 Electrical Disturbances

Supply voltage quality should be equal to a typical business or hospital environment.

3.2.6.4 Magnetic Disturbances

Power lines, including those of other devices, should not be placed near the device or its cables. Mobile two-way radios should be kept at the minimum safe distance from the device and its wiring.

3.2.7. Condition of Devices

Despite flawless workmanship, the devices may be damaged during operation. Therefore, you should visually inspect the device components mentioned before each use. Pay particular attention to crushed cables, damaged hoses and deformed plugs. If you find any damage, please refrain from using the devices and contact cetoni GmbH immediately. We will repair your devices as soon as possible. Never attempt to repair a device yourself.

3.3. Warranty and Liability

The devices left our facilities in perfect condition and may only be opened by cetoni GmbH. If a device is opened by an unauthorized person, all warranty and liability claims shall be void, in particular those referring to personal injury.

The warranty period is 1 year from the day of delivery. Any work done on the devices within this period shall not extend or renew the warranty.

cetoni GmbH assumes responsibility for its devices with respect to safety, reliability and function only if installation, readjustment, changes, extensions and

repairs are done by cetoni GmbH or an authorized party, and if the devices are used in accordance with the user manual.

The neMESYS syringe pump system complies with the applicable safety rules and standards. cetoni GmbH reserves all property rights for the relevant wiring, processes, names, software and devices.

4. Technical Data

4.1. Performance Data

Electrical Data	
Supply voltage VCC (ripple < 10%)	24 VDC
Peak current draw at 24 VDC	0.6 A
Typical current draw at 24 VDC	0.3 A

Inputs	
Analog input 1 (AI1)	resolution 11-bit 0 ... +5 V (Ri = 34 kΩ)
Analog input 2 (AI2)	resolution 11-bit 0 ... +5 V (Ri = 34 kΩ)
Digital input 1 (DI1)	+3 ... +36 VDC (Ri = 12 kΩ)
Digital input 2 (DI2)	+3 ... +36 VDC (Ri = 12 kΩ)
Digital input 3 (DI7)	+3 ... +36 VDC (Ri = 12 kΩ)

Outputs	
Digital output 1 (DO1)	open collector, max. 36 VDC (IL < 50 mA)
Digital output 2 (DO2)	open collector, max. 36 VDC (IL < 50 mA)
Digital output 3 (DO5)	push pull, max. 36 VDC (IL < 10 mA)

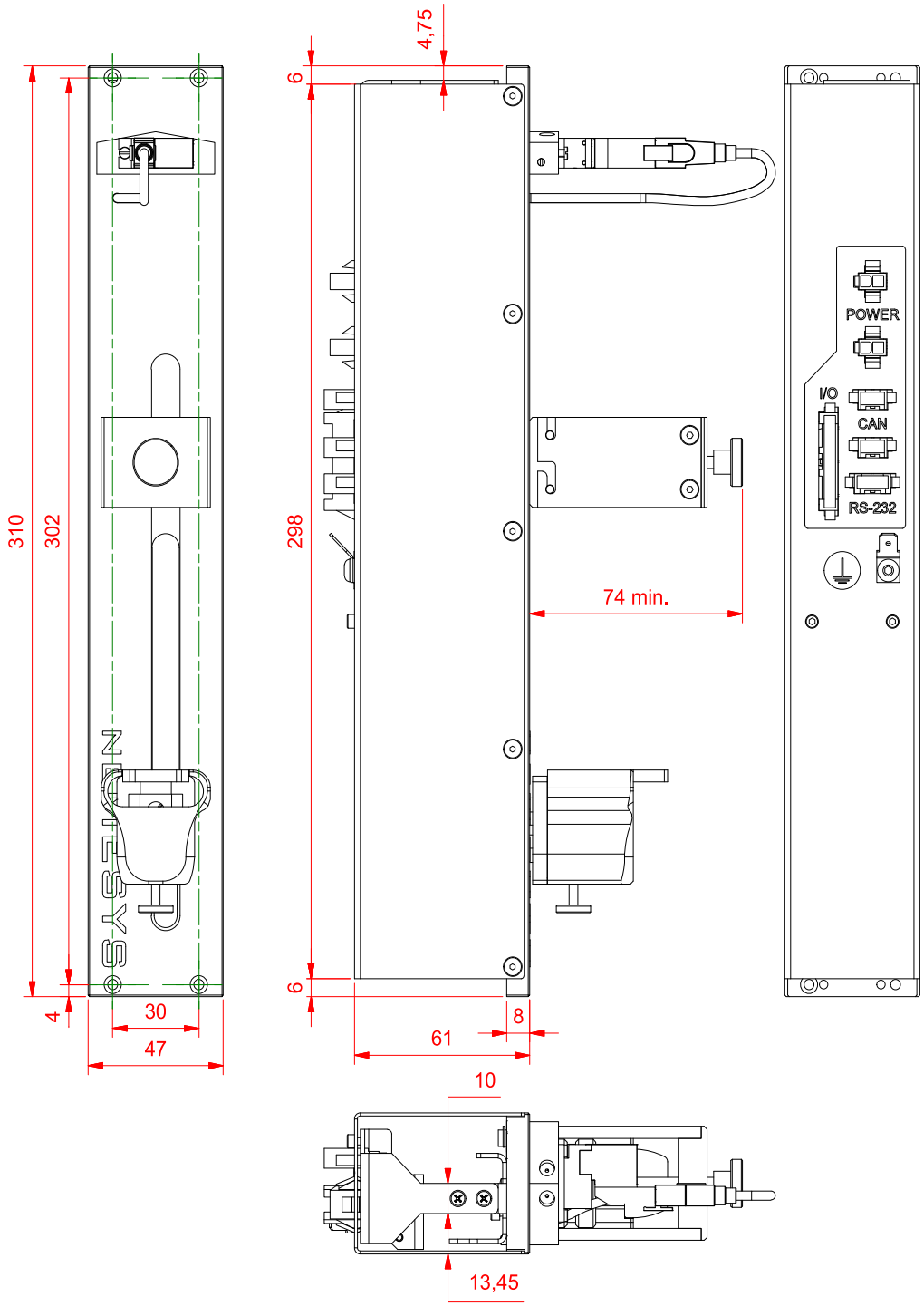
Interfaces		
CAN	CAN_H (high); CAN_L (low)	max. 1 Mbit / s (standard 1 Mbit / s)
RS232	RxD; TxD	max. 115200 bit / s (115200 bit / s)

Mechanical Data	
Weight	approx. 1100 g
Dimensions (L x W x H)	310 x 47 x 130 mm
Attachments	M3 screws

Ambient Conditions	
Operating Temperature	-10 … +45°C
Storage Temperature	-40 … +85°C
Air Humidity	Non-condensing 20 … 80 %
Sound power level	< 70 dB(A)

Connections	
Power supply	**on device:** two-row pin connector (2-pole type) Molex Mini Fit Jr **plug connector:** two-row socket (2-pole type) Molex Mini-Fit Jr. 39-01-2020 **crimp contacts:** crimp socket Molex Mini-Fit Jr.TM 444-76-1111 (AWG 18-24)
CAN	**on device:** 3-pole plug JST XARR-03V **plug connector:** 3-pole socket JST XAP-03V-1
RS232	**on device:** 4-pole plug JST XARR-04V **plug connector:** 4-pole socket JST XAP-04V-1
Signal	**on device:** 12-pole plug JST XARR-12V **plug connector:** 12-pole socket JST XAP-12V-1

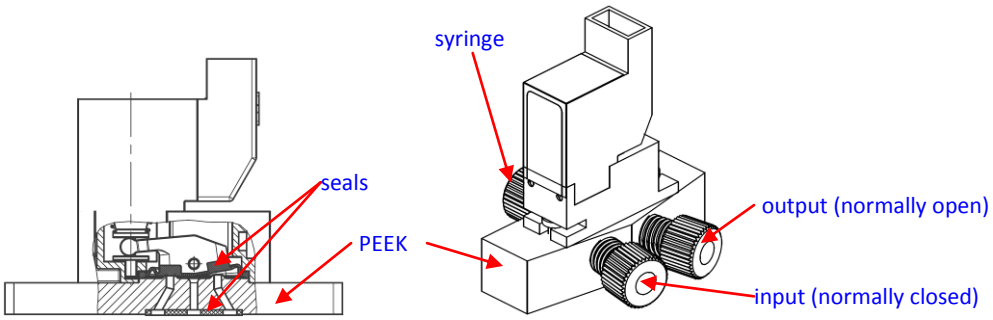
4.2. Dimensional Drawing of Pump



4.3. Standard Valve

Valve	
Housing material	PEEK
Sealing material	FFKM (perfluoroelastomer)
Media temperature	0 to +50°C
Max. viscosity	21 mm²/s
Internal volume	approx. 45 µl
Max. pressure	3 bar
Rated width	0.6 mm
Fluidic connections	¼“ – 28 UNF

4.4. Dimensional Drawing of Valve



CAUTION

There is a danger of damaging the housing or sealing material.

Before using the valve for the first time, please check the chemical compatibility of the media you want to use with the PEEK housing material and the FFKM (perfluoroelastomer) sealing material.

4.5. Dosing Performance

The following table provides an overview of the minimum and maximum dosing speeds of the various gear configurations as well as the resulting flow rates, using the example of a 1ml syringe with a 60 mm stroke.

Speeds and flow rates lower than those referred to as pulsation-free, will cause dosing precision to decrease slowly.

Gear		w/o	**14:1**	29:1
Min. speed [µm/s]		0.065	**0.065**	0.065
Min. pulsation-free speed [µm/s]		14.648	**1.042**	0.502
Max. speed [mm/s]		89	**6.33**	3.06
1 ml syringe with 60 mm stroke	Min. flow [µl/min]	0.065	**0.065**	0.065
	Min. pulsation-free flow [µl/min]	14.648	**1.042**	0.502
	Max. flow [ml/min]	89	**6.33**	3.05

5. Transport and Storage

5.1. Transport

Please do not lift or transport the modules in assembled state. Transport in assembled condition is only permitted in the original packaging.

Only use the original packaging for transport and shipping.

CAUTION

There is a danger of damaging the device!

Do not transport the modules in assembled condition.

5.2. Maintenance and Care

When used properly the device is maintenance-free. Should you encounter problems that you cannot fix yourself or which require opening the device, please contact cetoni GmbH to discuss further actions. The device may only be opened by cetoni GmbH or authorized service staff. Violating this rule will void the warranty.

Wipe the device with a moist (not wet) cloth, so that no liquid can drip into the device. In case of heavy soiling you may use a small amount of detergent or alcohol.

6. Hardware Operation

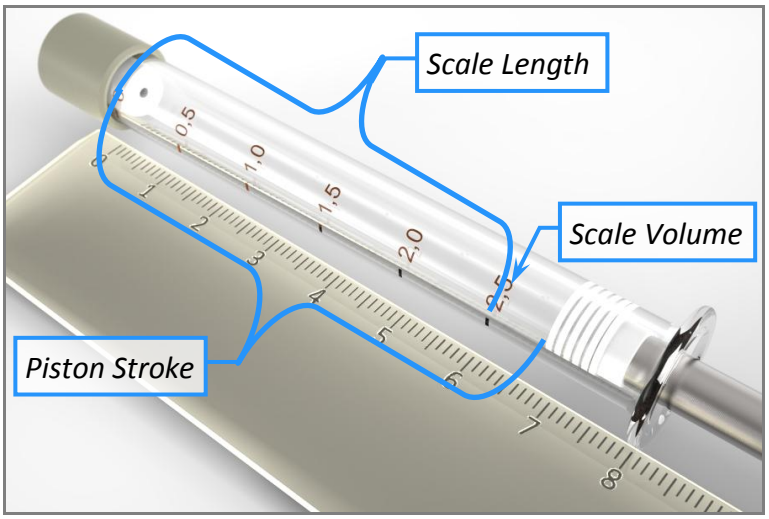
6.1. Installing a Syringe

The syringe holder on neMESYS modules allows the use of syringes with outside diameters of 6 to 30 mm and a maximum piston stroke of 65 mm.

IMPORTANT

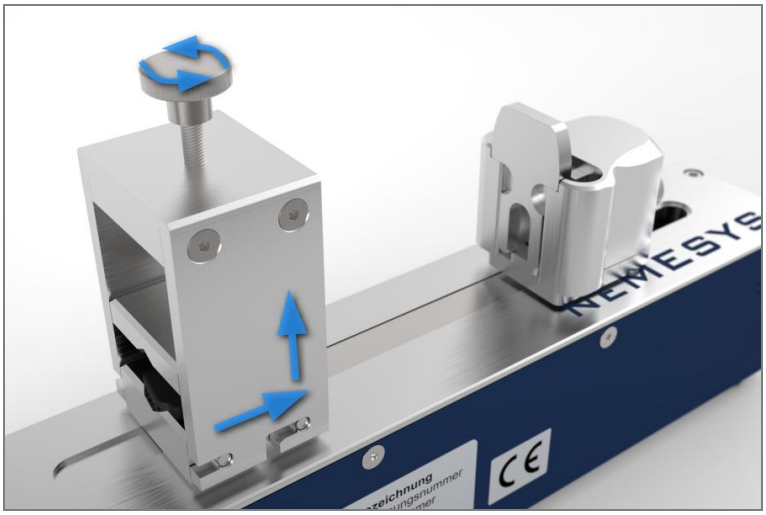
Use high-quality glass syringes with outside diameters of 6 to 30 mm to guarantee precise flow rates.

Before mounting a syringe on the neMESYS module it needs to be configured and selected in the software. The relevant procedure is described in the software manual. You will need the volume (scale volume), the rated stroke (scale length) and the piston stroke, which may be different from the scale length.

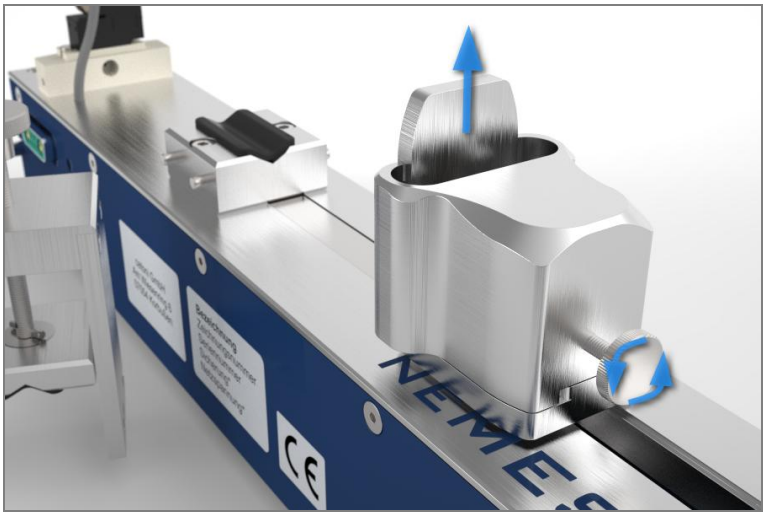


Follow this procedure to mount a syringe on the module:

Loosen the knurled screw at the syringe holder. You can now slide the bracket out of the pins and lift it up.



Loosen the knurled screw of the piston holder and remove the adapter plate. You can now also lift up the clamping piece.

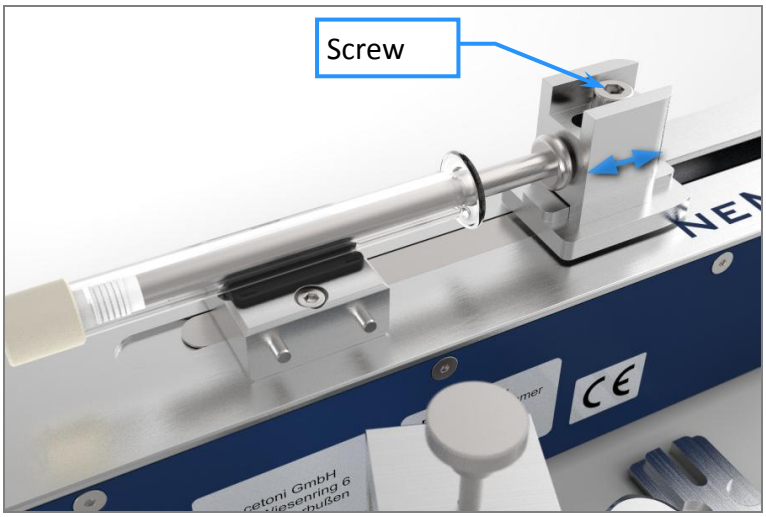


To utilize the entire syringe volume, move the piston holder to its maximum forward position through the software. Place an empty syringe onto the remaining base of the syringe holder in such way that the piston touches the piston holder.

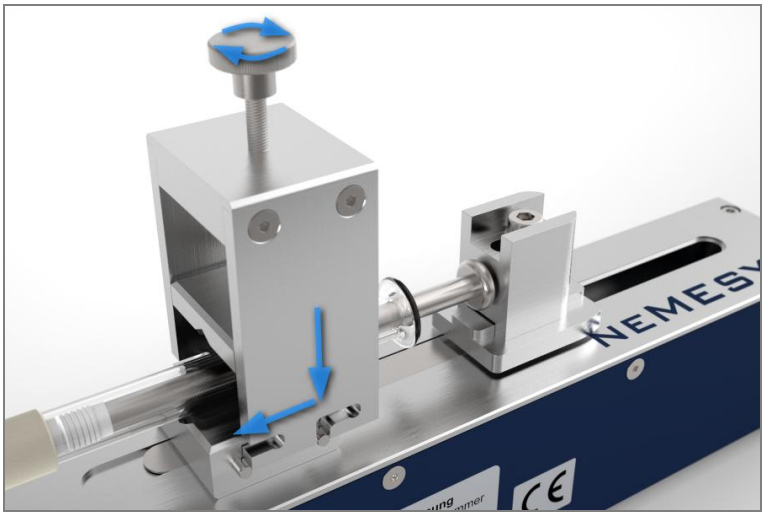
The syringe position can be varied somewhat by shifting the piston holder. To do that, loosen the screw with a 4mm Allen wrench.

CAUTION

To avoid damage make sure that the remaining syringe stroke is always the same as or larger than that of the module.

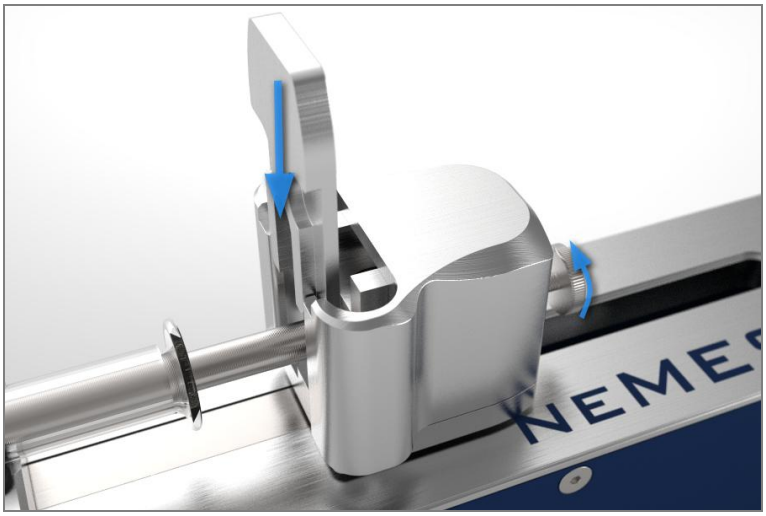


Now reinsert the bracket of the syringe holder, place it on top of the pins and fix the syringe in position using the large knurled screw.



Put the clamping piece back on and insert the adapter plate matching the piston diameter in such way that the piston head sits between the piston holder and the adapter plate.

The piston is fixed in position by slightly tightening the knurled screw in the back. Make sure that syringe and syringe piston are straight and lined up.



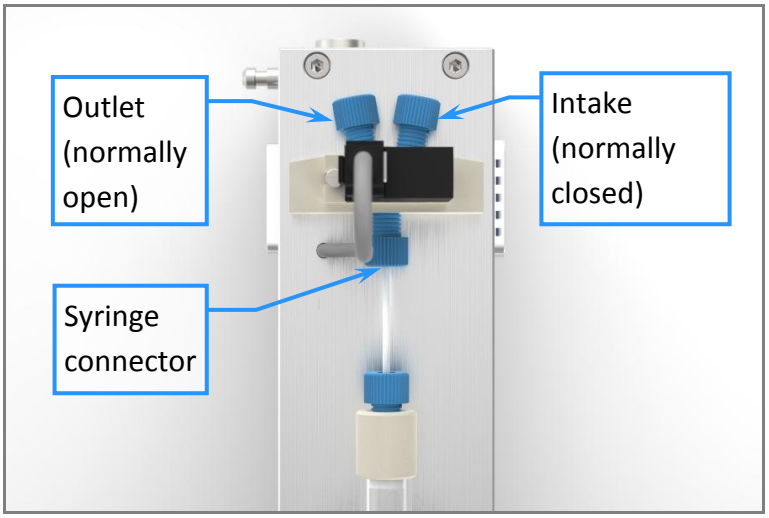
IMPORTANT

Syringes, and seals in particular, are wear and tear parts. Please check them on a regular basis and replace them if necessary.

6.2. Fluidic / Valve

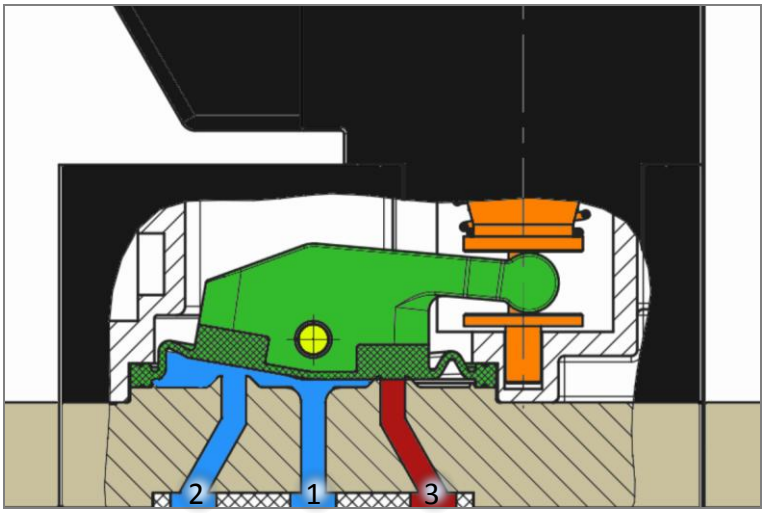
The neMESYS module can be fitted with an optional valve. This valve allows you to switch the syringe connector between your application (outlet) and a reservoir (intake), thereby enabling automatic refilling of the syringe. You can use the software to adjust the valve is such way that it switches to the inlet automatically during filling.

The three connection points are fitted with a ¼“-28 UNF thread and allow the use of regular HPLC fittings.



A rocker inside the valve (green) connects the syringe connector (1) to the outlet (2) or the intake (3). In the following image the syringe is connected to the outlet (2), while the intake (red) is closed.

A FFKM membrane (shaded green area) connected to the rocker seals off the fluidic flow. The membrane also limits the valve's operating pressure to 3 bar.



CAUTION

Please observe the maximum operating pressure of 3 bar to avoid damage to the standard valve.

CAUTION

Before using the valve please check the chemical resistance of the PEEK housing material and the FFKM (perfluoroelastomer) sealing material with respect to the fluid you are planning to dose in your application.

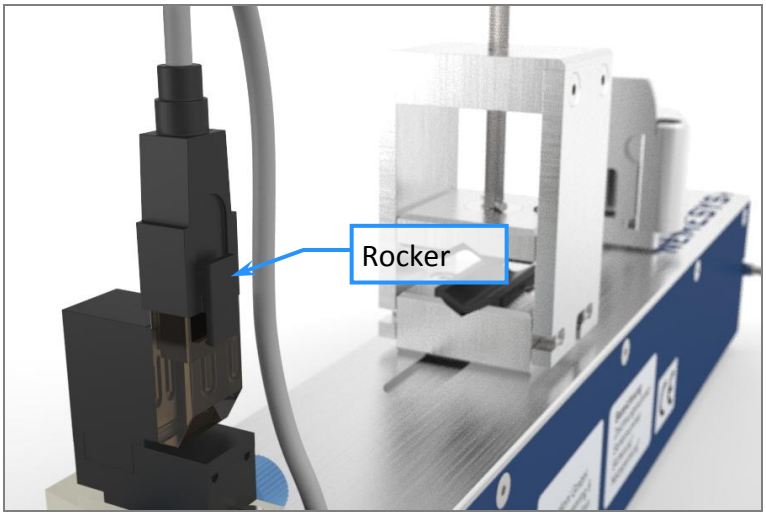
6.3. Removing Valves

The valve can be removed from the device in a few easy steps. This simplifies the connection of hoses and cleaning, while also enabling you to operate the device without a valve, when not needed.

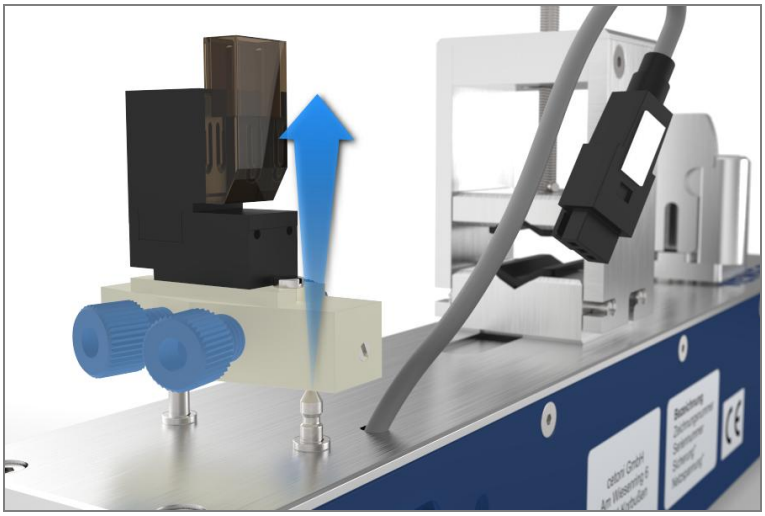
To remove the valve, push the rocker at the plug and pull it off. When replacing it later on, please make sure to face the plug in the correct direction. The white area should face the valve, while the rocker should point away from the valve.

CAUTION

Please observe the correct placement of the valve plug. The white area should face the valve, while the rocker should point away from the valve.

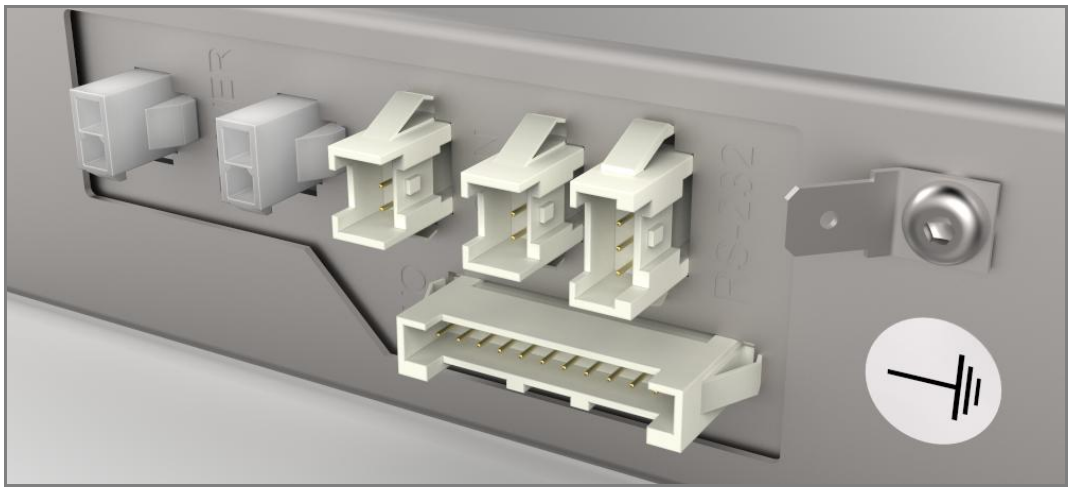


You can then simply lift the valve to remove it.



7. Electrical Interfaces

7.1. Overview



All interfaces for connecting the device to a power supply, a PC or an external controller are located on the bottom of the device (figure 1). The following interfaces are available:

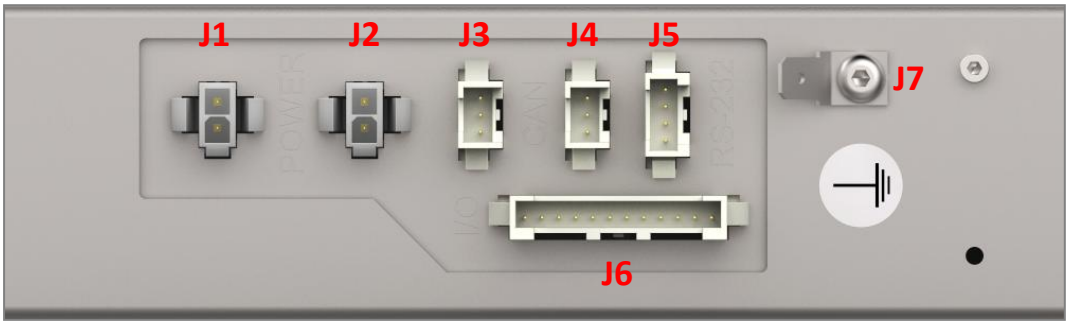
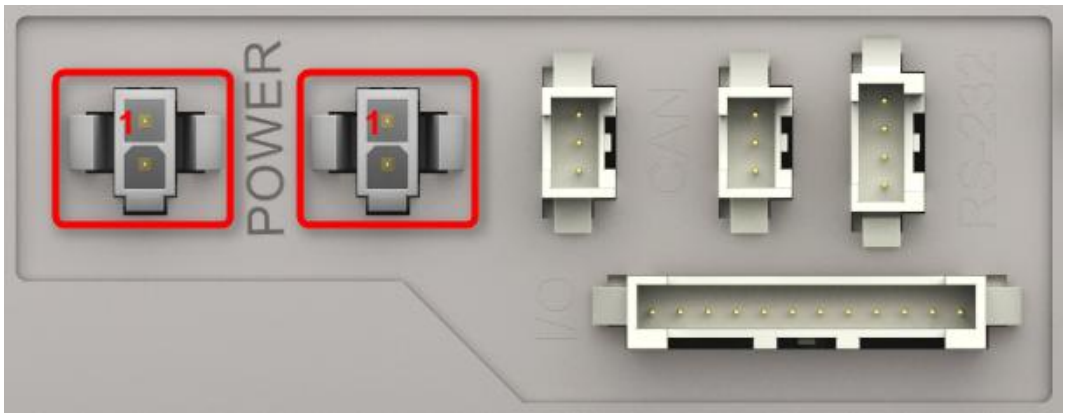


Figure 1 – Electrical Interfaces

Connector	Interface
J1 / J2	Power supply 24VDC In / Out
J3 / J4	CAN interfaces In / Out
J5	RS232 interface
J6	I/O signal interface

J7	Shield connection

7.2. Power Supply (J1 / J2)



7.2.1. Pin Assignment

Pin No.	Signal	Description
1	Ground	Grounding of supply voltage
2	+Vcc	Supply voltage +24 VDC

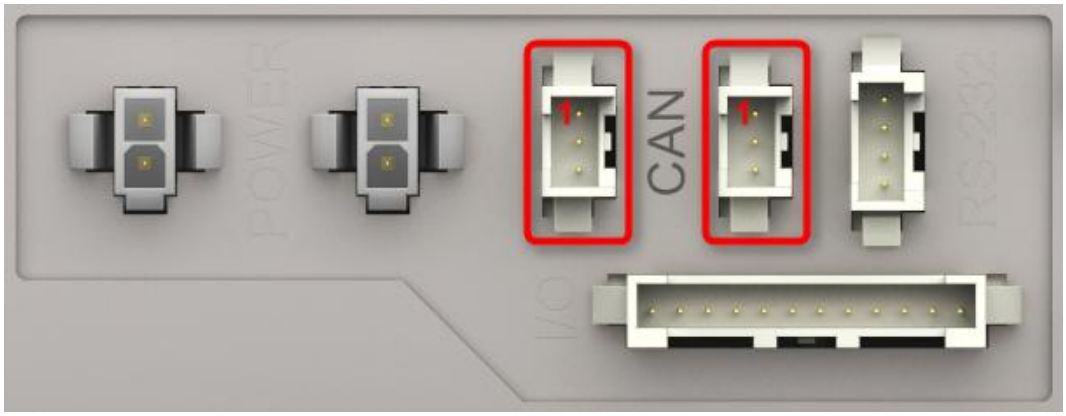
7.2.2. Technical Data

Any power supply can be used, as long as it complies with the following requirements:

Power supply requirements	
Output voltage	24 VDC
Output current	Depends on power load and number of modules Typical current draw of one module: 0.3 A Surge current draw of one module: 0.6 A

Information regarding contacts	
Plug connectors	Molex mini-Fit Jr.TM 2-pole type (39-01-2020)
Crimp contacts	Molex mini-Fit Jr.TM crimp socket (444-76-1111)
Crimp tool	Molex crimp tool (69008-0724)

7.3. CAN Interface (J3 / J4)



7.3.1. Pin Assignment

Pin no.	Signal	Description
1	CAN_H	CAN high bus line
2	CAN_L	CAN low bus line
3	CAN_GND	CAN ground

7.3.2. Technical Data

Standard type	CAN high-speed, ISO 11898 compatible
Maximum bit rate	1 Mbit/s
Protocol	CANopen DS-301, DS-402
Node ID	Software

7.3.3. Connecting neMESYS to CAN bus line CiA DS-102

neMAXYS	CAN 9 Pin D-Sub (DIN41652)
Pin 1 “CAN_H”	Pin 7 “CAN_H” high bus line
Pin 2 “CAN_L”	Pin 2 “CAN_L” low bus line
Pin 3 “CAN_GND”	Pin 3 “CAN_GND” ground
Housing “CAN_Shield”	Pin 5 “CAN_Shield” cable shield

IMPORTANT

- *Please observe the maximum Baud rate of your CAN master*
- *The standard Baud rate at the time of shipping is 1 Mbit/s*
- *The CAN bus must be terminated with 2 termination resistors (see section 7.6 on CAN bus termination)*

7.4. RS-232 Connection (J5)

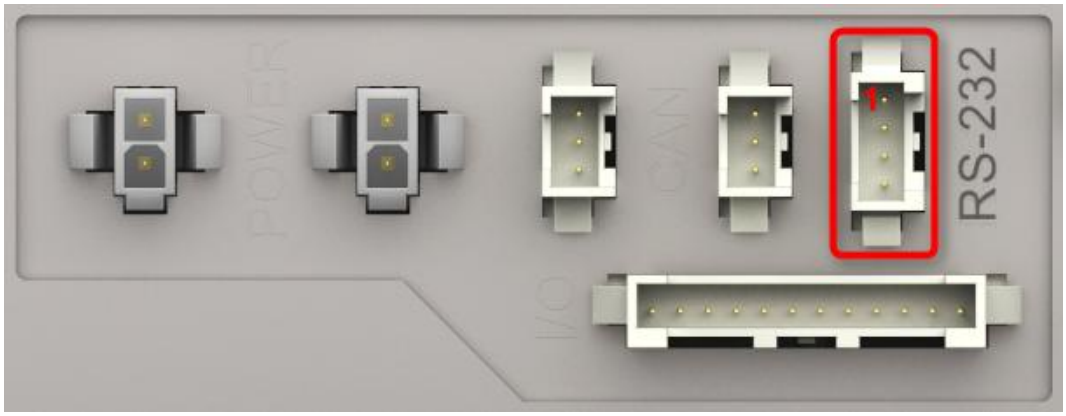


Figure 2 - RS232 connection (J2)

7.4.1. Pin Assignment

Pin no.	Signal	Description
1	neMESYS TxD	neMESYS RS232 send
2	neMESYS RxD	neMESYS RS232 receive
3	GND	RS232 ground
4	Shield	RS232 shield

7.4.2. Technical Data

Maximum input voltage	± 30 V
Output voltage	typically ± 9 V @ 3k grounded
Maximum bit rate	115200 bit/s (standard 38 400 bit/s)
Internal RS232 driver/receiver	EIA RS232 Standard

7.4.3. Connecting neMESYS to a PC

neMESYS RS-232 (JST)	PC RS-232 (DSUB)
Pin 1 “neMESYS TxD”	Pin 2 “PC RxD”
Pin 2 “neMESYS RxD”	Pin 3 “PC TxD”
Pin 3 “GND”	Pin 5 “GND”

IMPORTANT

Please observe the maximum Baud rate of the RS232 interface on your PC or micro controller. The standard Baud rate setting is 115200 bit/s.

7.5. Signal Connection (J6)

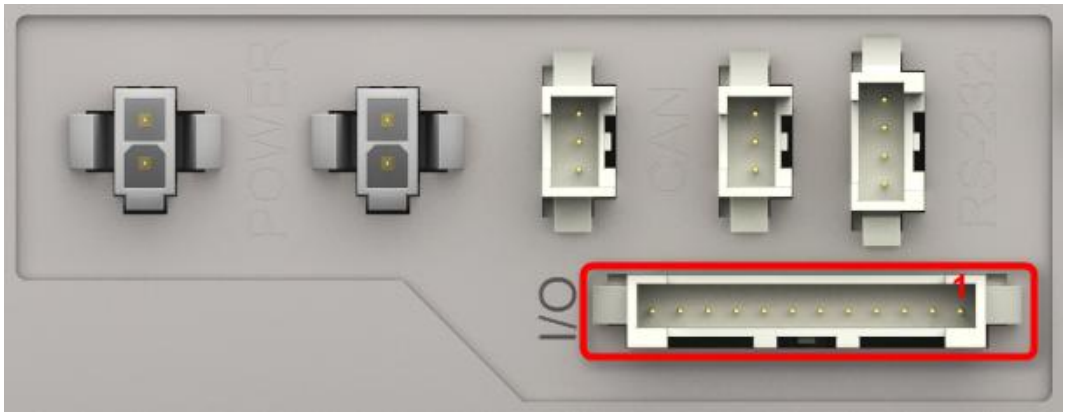


Figure 3 – Signal interface (J1)

"Multi-purpose" digital I/Os and analog inputs are available

7.5.1. Pin Assignment

Pin no.	Signal	Description
1	AnIN 1	Analog input 1 (0 – 5V)
2	AnIN 2	Analog input 2 (0 – 5V)
3	DigIN 1	Digital input 1 "multi-purpose"
4	DigIN 2	Digital input 2 "multi-purpose"
5	DigIN 7	Digital input 7 "multi-purpose"
6	DigOUT 1	Digital output 1 "multi-purpose" / valve voltage
7	DigOUT 2	Digital output 2 "multi-purpose" / valve switching
8	DigOUT 5	Digital output 5 "multi-purpose"
9	GND	Digital signal ground
10	+24 VDC	Auxiliary voltage 24 VDC
11	+5 VDC	Auxiliary voltage output 5 VDC
12	AGND	Analog signal ground

7.5.2. Analog Input 1 and 2 (Pin 1 and 2)

As a standard, analog inputs are defined as “general purpose” and can be configured through the software.

AnIN1 AnIN2 A_Gnd	Pin [1] Pin [2] Pin [12]
Input voltage range	0 ... 5 VDC
Max. input voltage	0 … 10 VDC
Input resistance	typically 34 kΩ against A_GND [12]
A/D converter	11-bit
Resolution	2.49 mV
Bandwidth	250 Hz

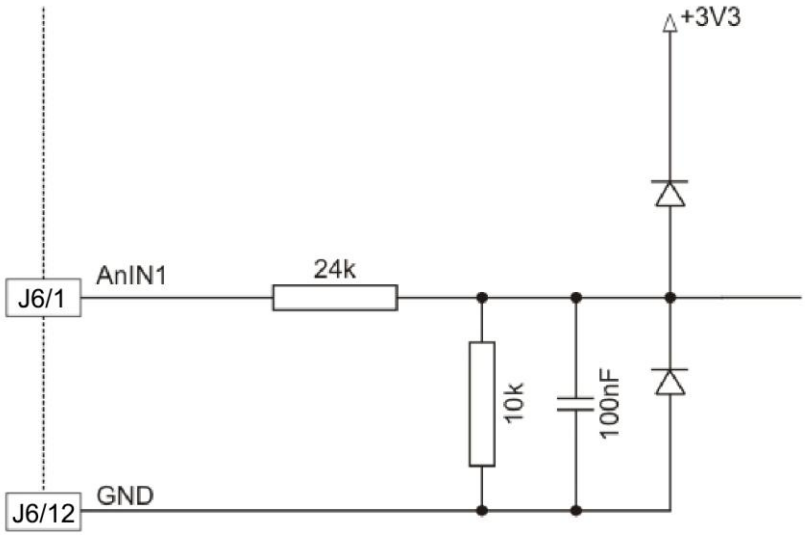


Figure 4 – Analog input 1 and 2

7.5.3. Digital Inputs 1 and 2 (Pin 3 and 4)

“Multi-purpose” inputs can be freely configured and utilized by the user.

DigIN1 DigIN2 GND	Pin [3] Pin [4] Pin [9]
Type of input	Single ended

Input voltage	0 ... 36VDC
Max. input voltage	-36 ... +36 VDC
Level 0	typically < 0.8 VDC
Level 1	typically > 2.0 VDC
Input resistance	typically 8 kΩ
Input current at level 1	typically 270 µA @ 5 VDC
Switching delay	< 300µs

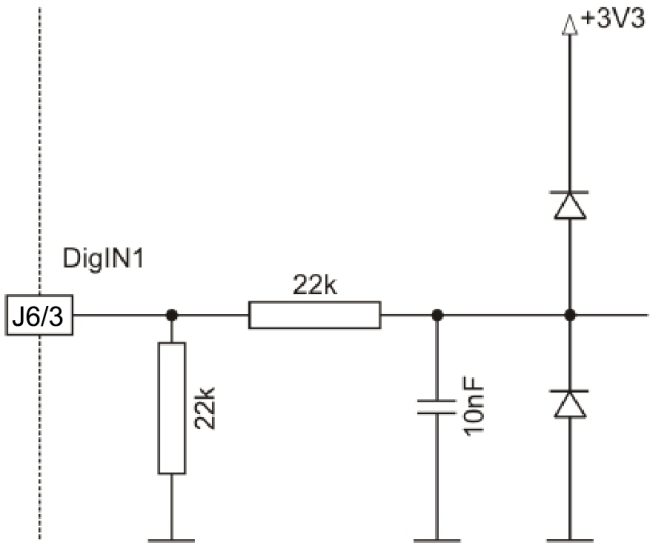


Figure 5 – Digital input 1 and 2

7.5.4. Digital Input 7 (Pin 5)

“Multi-purpose” inputs can be freely configured and utilized by the user.

DigIN7 GND	Pin [5] Pin [1]
Input voltage	0 ... 5VDC
Max. input voltage	-7.5 … + 12.5 VDC
Level 0	typically < 0.8 VDC
Level 1	typically > 2.0 VDC
Input resistance	typically 20 kΩ against GND
Max. input frequency	2.5 MHz

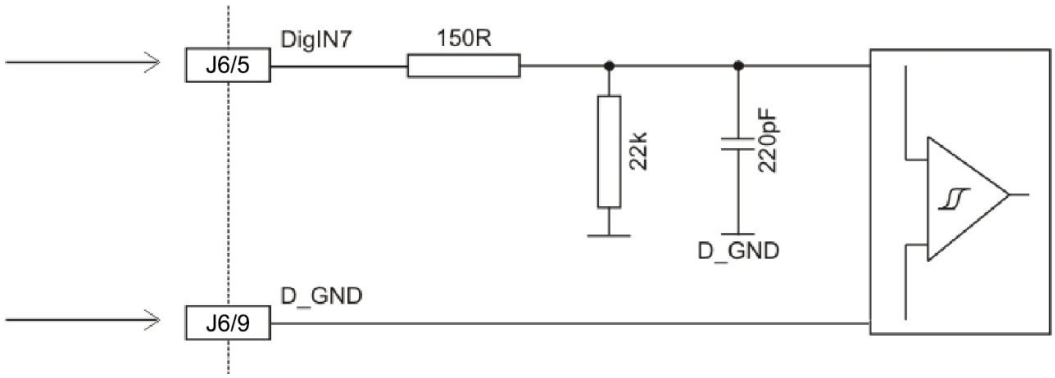


Figure 6 – Digital input 7 “single-ended”

7.5.5. Digital Output 1 and 2 (Pin 6 and 7)

7.5.5.1 Specification

Outputs 1 and 2 are used for switching the valve. When the valve is not used the outputs may be free configured and utilized by the user.

DigOUT1 DigOUT2 AGND	Pin [6] Pin [7] Pin [12]
Circuit	Open Collector (internal pull-up resistor 2k2 and diode to +5 VDC)
Switching delay	<3 µs

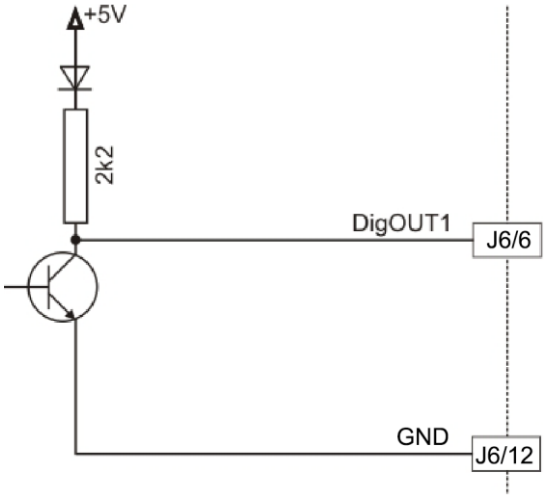


Figure 7 – Digital output 1 and 2

7.5.5.2 Wiring Examples

DigOUT "Drain"	
Maximum input voltage	+36 VDC
Maximum load current	50 mA
Maximum voltage drop	<1.0 V @ 50 mA

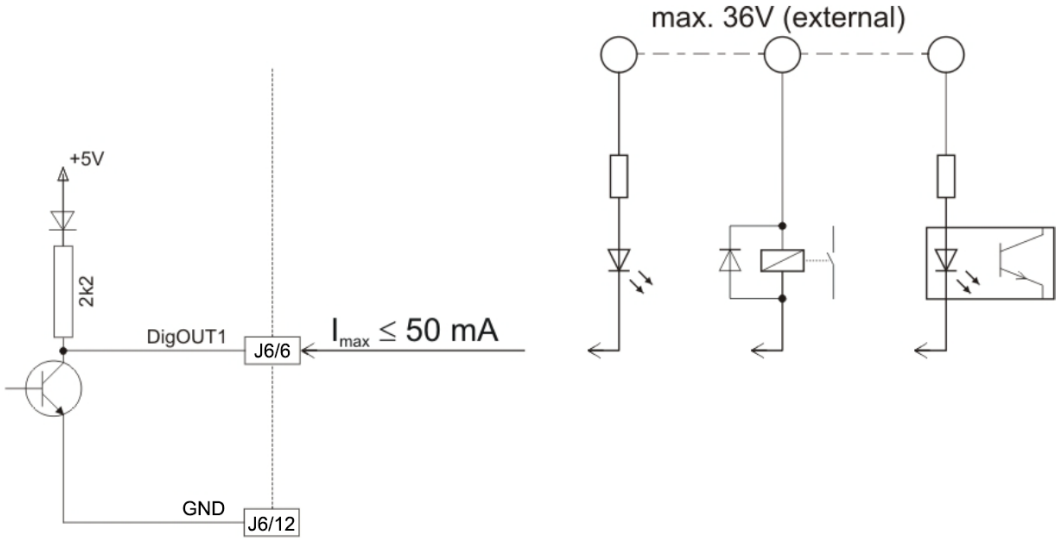


Figure 8 – Digital output 1 and 2 wiring example "drain"

DigOUT "Source"	
Output voltage	$U_{out} \approx 5V - 0.75V - (I_{load} \times 2200\ \Omega)$
Maximum load current	$I_{load} \leq 2$ mA

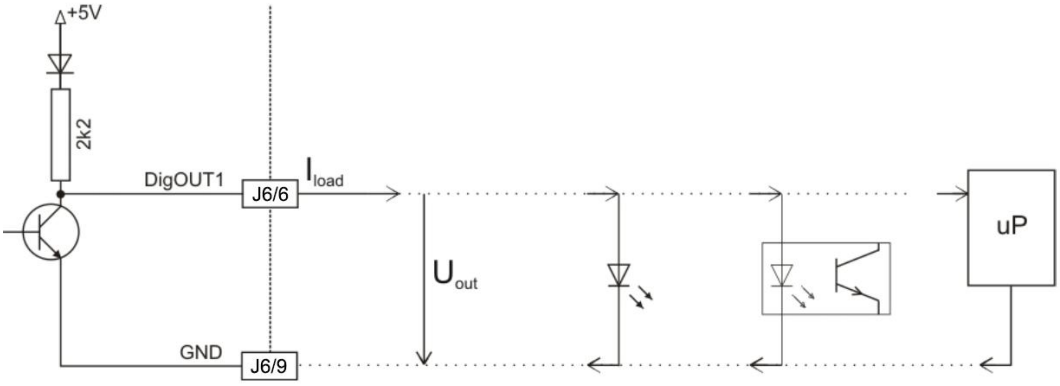


Figure 9 – Digital output 1 wiring example "source"

7.5.6. Digital Output 5

This output is defined as “high speed” and may be freely configured by the user.

7.5.6.1 Specification

DigOUT5 GND	Pin [8] Pin [9]
Circuit	Push-pull stage
Switching delay	<10 ns

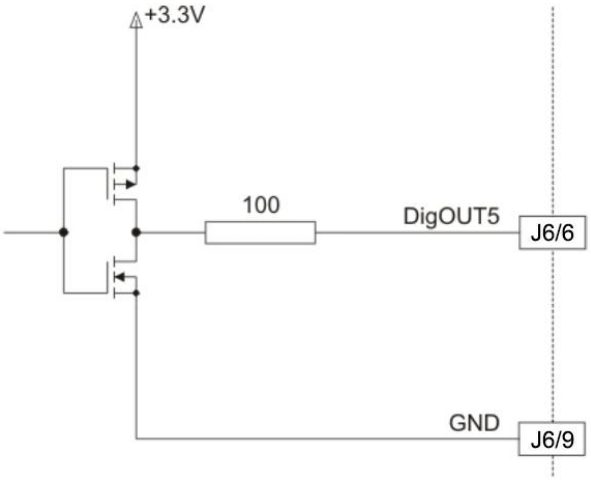


Figure 10 – Digital output 5

7.5.6.2 Wiring Examples

DigOUT “Drain”	
Maximum input voltage	$U_{in} \leq 3.3$ VDC
Maximum load current	$I_{max} \leq 24$ mA
Maximum voltage drop	$U_{drop} < 0.55\ V + (I_{max} \times 100\ \Omega)$

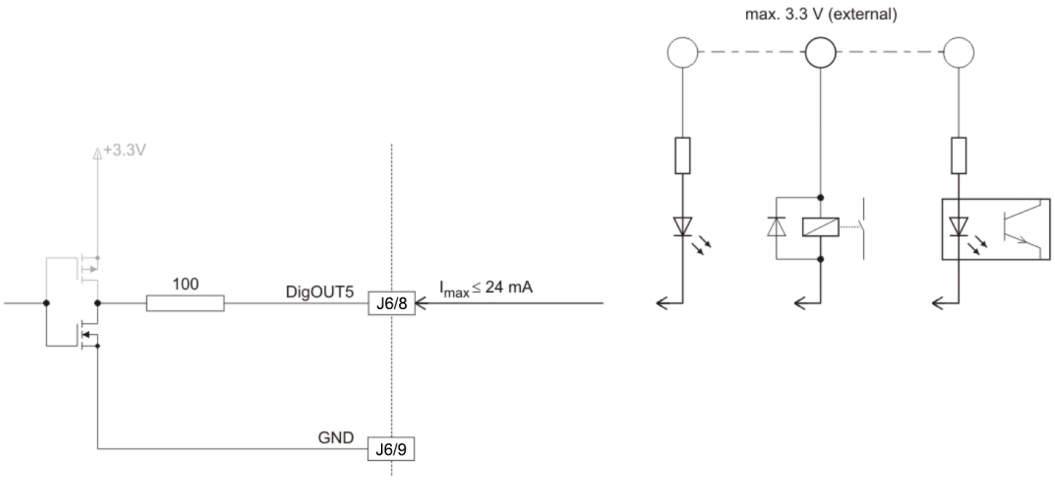


Figure 11 – Digital output 5 "drain"

DigOUT "source"	
Output voltage	$U_{out} \approx 3.3V - 0.75V - (I_{load} \times 100\ \Omega)$
Maximal load current	$I_{load} \leq 24$ mA

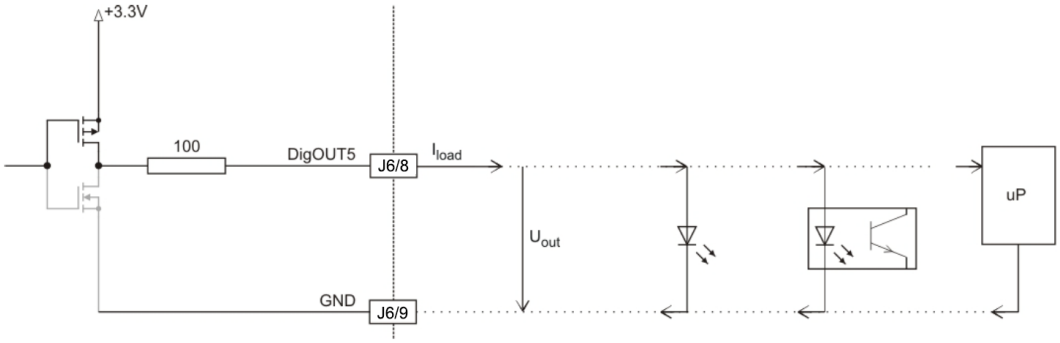


Figure 12 – Digital output 5 wiring examples "source"

7.6. CAN-Bus Termination

The CAN-Bus must be terminated on both ends with a 120 Ω termination resistor.

7.7. Switching the integrated Valve

The integrated valve is switched by digital outputs 1 and 2. Switching of the valve is done through digital output 2. Digital output 1 can be used to lower the voltage during the activated state in order to prevent the valve from heating up due to the coil. The following logic table shows the relevant valve conditions for all possible signal combinations of digital outputs 1 and 2:

Dig. Out 1 Valve voltage	Dig. Out 2 Valve switching	Coil	LED	Valve state
0	0	off	off	
0	1	voltage lowered	less bright	
1	0	off	off	
1	1	voltage 24V	bright	

This means that for switching the valve you set both outputs to 1. This switches the valve with the maximum switching voltage of 24 V. If you want to prevent the valve from heating up, switch digital output 1 to 0 after approximately 1 second. This causes the voltage of the coil current to decrease (15 V) and thereby lessens the heating effect.

To switch the valve to the other direction simply set both outputs to 0.

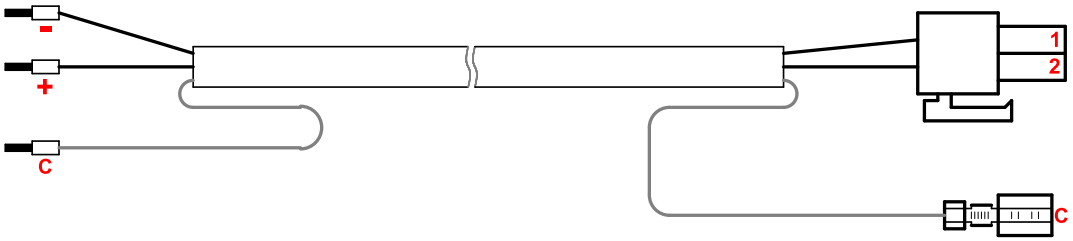
After turning the device on, both outputs are set to 0.

IMPORTANT

Activating the coil in the valve for an extended period of time causes the coil to heat up, which, in case of low flow rates, may warm up the medium flowing through the valve. Lowering the valve voltage after switching lessens this heating-up effect.

8. Cable Set

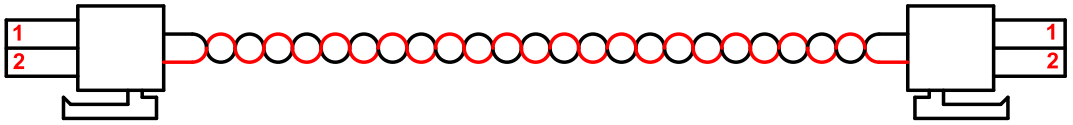
8.1. Power Cable



Pins A	Signal	Pins B
-	Ground – Power GND	1
+	Supply voltage +24 VDC	2
C	Shield	C

Technical Data	
Cable size	2 x 1.5 mm^2
Side A	Cable end sleeves 1.5 mm^2
Side B	Molex Mini-Fit Jr. 39-01-2020 Molex Mini-Fit Jr. crimp contact socket 444-76-xxxx

8.2. Power Connection cable

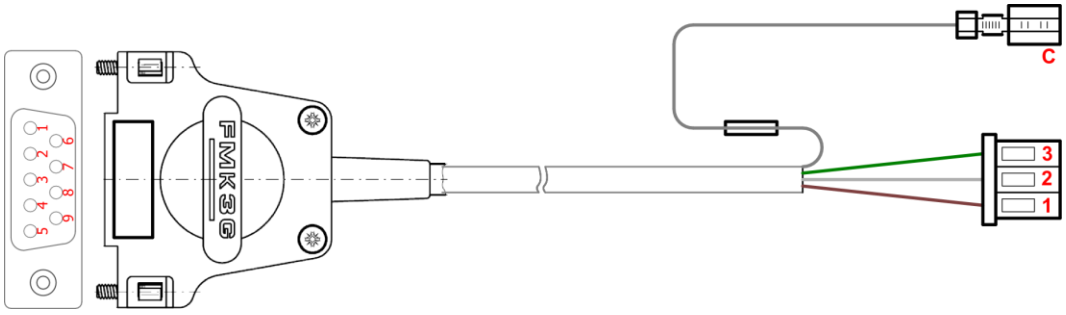


Pins A	Signal	Pins B
1	Ground – Power GND	1

2	Supply voltage +24 VDC	2

Technical Data	
Cable Size	2 x 1.3 mm^2
Side A	Molex Mini-Fit Jr. 39-01-2020 Molex Mini-Fit Jr. crimp contact socket 444-76-xxxx
Side B	Molex Mini-Fit Jr. 39-01-2020 Molex Mini-Fit Jr. crimp contact socket 444-76-xxxx

8.3. CAN Cable (terminated DSub socket)



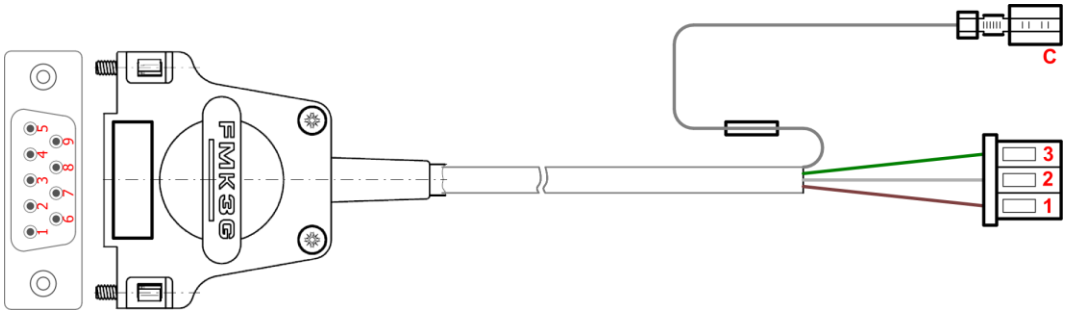
Pins A	Signal	Pins B
Housing	CAN shield	C
3	CAN GND	3
2	CAN low	2
7	CAN high	1

Technical Data	
Cable size	3 x 0.125 mm^2, twisted pair, shielded
Side A	D-Sub socket DIN 41652, 9-pole type, with attachment screws, 120Ω resistor between CAN high (7) and CAN low (2)
Side B	3-pole socket JST XAP-03V-1

IMPORTANT

The socket contains a 120Ω resistor placed between CAN high and CAN low, acting as a CAN-Bus termination.

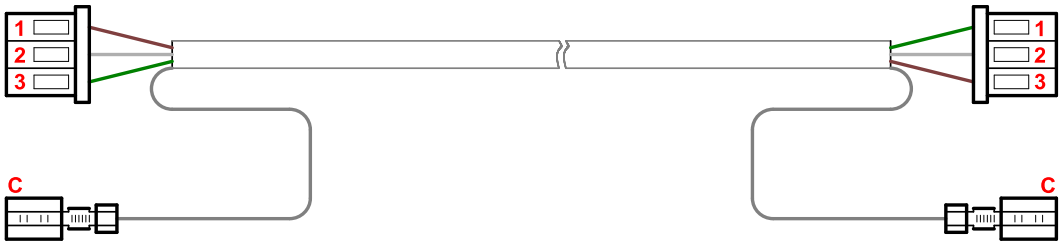
8.4. CAN Cable (DSub plug)



Pins A	Signal	Pins B
Housing	CAN shield	C
3	CAN GND	3
2	CAN low	2
7	CAN high	1

Technical Data	
Cable size	3 x 0.125 mm^2, twisted pair, shielded
Side A	D-Sub plug DIN 41652, 9-pole type, with attachment screws
Side B	3-pole socket JST XAP-03V-1

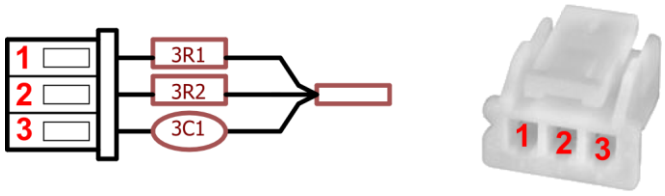
8.5. CAN Connection Cable



Pins A	Signal	Pins B
1	CAN high	1
2	CAN low	2
3	CAN GND	3
C	CAN shield	C

Technical Data	
Cable size	3 x 0.125 mm^2, twisted pair, shielded
Side A	3-pole socket JST XAP-03V-1
Side B	3-pole socket JST XAP-03V-1

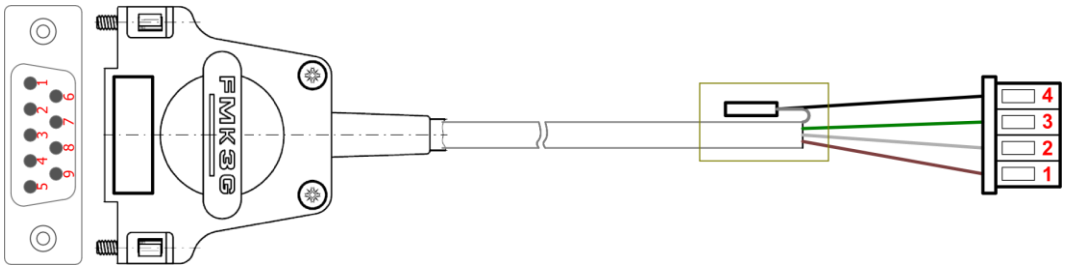
8.6. CAN Terminator



Pins A	Signal	Pins B
1	CAN high	1
2	CAN low	2
3	CAN GND	3

Technical Data	
Termination	120Ω resistor between CAN high (1) and CAN low (2)
Plug connector	3-pole socket JST XAP-03V-1

8.7. RS232 Cable (DSub socket)



Pins A	Signal	Pins B
Housing	Shield	4
5	Ground	3
2	neMESYS TxD	2
3	neMESYS RxD	1

Technical Data	
Cable size	3 x 0.125 mm^2, twisted pair, shielded
Side A	D-Sub plug DIN 41652, 9-pole type, with attachment screws
Side B	4-pole socket JST XAP-04V-1

8.8. USB-to-CAN Adapter

Pins A	Signal
Housing	CAN shield
3	CAN GND
2	CAN low
7	CAN high

Technical Data	
Cable Size	3 x 0.125 mm^2, twisted pair, shielded
Side A	D-Sub plug DIN 41652, 9-pole type, with attachment screws
Side B	USB type A

9. Setup & Cable Connection

9.1. Mechanical Setup

Use the 4 holes (sunk) at the edges of the module's base plate (see section 4.2 for the dimensional drawing of the pump) to install the module into the front plate of your device. Use M3 bolts for attachment.

9.2. Introduction to Cable Connection

Two different cable connections are required for installing neMESYS pumps:

1. Connection of the first module to the power supply and the controller (PLC, PC)
2. Connecting the power supply and data line from one module to the next.

Follow these steps to connect your devices:

9.3. Step 1 – Connecting the Power Cable

Connect the power cable to the plug connector J1 of your neMESYS OEM module. Connect the other end of the cable to your power supply (+24 VDC). The required output current is load-dependent (typical current for one module ≈ 0.3 A; surge peak current ≈ 0.6 A).

9.4. Step 2 – Data Connection

9.4.1. Introduction

Data connection to the PC can be established through RS232 or CAN bus. The cable connection for both connection types is described in the following sections. Use the section relevant to your type of connection.

9.4.2. Data Connection through CAN

You may choose from two connection options to connect neMESYS modules through CAN:

- *Option 1* – If you use neMEYSYS pumps exclusively and there is no existing CAN bus or you would like to connect the pumps directly to a PC using CAN, please connect the CAN cable (terminated DSub socket) to CAN interface J3 of the first neMESYS OEM module. Then connect the DSub socket of the cable directly to the respective plug of the USB-to-CAN adapter.

- *Option 2* – If you want to integrate the neMESYS pumps into an existing CAN bus, please use the CAN cable (DSub plug). Connect the cable to CAN interface J3 of the first neMESYS OEM module. Then connect the DSub plug to your existing CAN bus.

IMPORTANT

The CAN cable (terminated DSub socket) already contains a 120Ω bus termination resistor to terminate one side of the CAN bus. When using the CAN cable (DSub plug), you have to establish the termination yourself (see CAN terminator)

9.4.3. Data Connection through RS232

Connect the RS232 cable (DSub plug) to RS232 connection J5 of the first neMESYS OEM module. Connect the 9-pole DSub socket at the other end of the cable to the respective plug connector of your controller (PC, PLC).

9.5. Step 3 – Power Supply of additional Modules

Connect the end of the power connection cable to power connector J2 of the current OEM-module. Connect the other end to power connector J1 of the next module in your setup. In this way, you can supply power to every additional module.

9.6. Step 4 – Data Connection to additional Modules

Use the CAN connection cable to connect the data bus to additional neMESYS OEM modules. Connect CAN connector J4 of the first module to CAN connector J3 of the next module. The individual elements of a CAN network should be arranged electrically in line. Using the CAN connection cables you can route the internal CAN bus in a line structure from one module to the next.

9.7. Step 5 – CAN Bus Termination

CAN bus lines must be terminated on both ends using a 120 Ohm resistor. You can do this very simply with the neMESYS OEM CAN termination plug.

If a neMESYS OEM module is the first device in your CAN network, insert the CAN terminator into CAN connector J3. If you use the CAN cable (terminated DSub socket), this will not be necessary since the resistor is already integrated into the

cable's DSub socket. If a neMESYS OEM module is the last module in your CAN network, insert the CAN terminator into CAN connector J4 of this module.

10. Disposal

Please send your old devices back to cetoni GmbH. We will take care of proper disposal pursuant to the relevant laws and regulations.

Before you send a device back to cetoni, please decontaminate it, if required, and add a completed contamination declaration to your shipment.